STRENGTHENING THE PLURALISTIC AGRICULTURAL EXTENSION SYSTEM IN BIHAR STATE, INDIA

A MEAS Rapid Scoping Mission
September 24 to October 5, 2012

November 2013

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Report on the MEAS Rapid Scoping Mission
carried out Sept. 24-Oct. 5, 2012

Final Report submitted to USAID BFS on November 14, 2013

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Leader with Associates Cooperative Agreement No. AID-OAA-L-10-00003

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ACRONYMS

ADE	Additional Director Extension
AKRSP	Aga Khan Rural Support Program
ATMA	Agricultural Technology Management Agency
BAMETI	Bihar Agricultural Management and Extension Training Institute
BAO	Block Agricultural Officer
BAU	Bihar Agricultural University
BTT	Block Technical Team
CRS	Catholic Relief Services
DAESI	Diploma in Agriculture Extension Services for Input dealers
DAO	District Agricultural Officer
DAOE	District Agricultural Officer – Extension
DEE	Director of Extension Education
DoA	Department of Agriculture
EAS	Extension and Advisory Services
e-Kisan	e-Kisan Bhawan
FA	Farmer Advisors
FAC	Farmer Advisory Council
FIAC	Farmer Information and Advisory Center
FIG	Farmer Interest Group
GoB	Government of Bihar
GoI	Government of India
ICAR	Indian Council of Agricultural Research
ICT	Information and Communication Technology
IFFCO	Indian Farmers Fertilizer Cooperative
IRRAS	Improved Rice-based Rain-fed Agricultural Systems
ISC	Indian School Certificate
KCC	Kisan Call Center
KVK	Krishi Vigyan Kendra
MANAGE	National Institute of Agricultural Extension Management
MEAS	Modernizing Extension and Advisory Services Project
NGO	Non-Governmental Organization
NFSM	National Food Security Mission
NHM	National Horticulture Mission
PACS	Primary Agricultural Cooperative Societies
RAU	Rajendra Agricultural University
SAO	Subdistrict Agricultural Officer
SAU	State Agricultural University
SIM	Subscriber Identify Module
SMS	Subject Matter Specialist

ACKNOWLEDGEMENTS

A rapid scoping mission was undertaken by the Modernizing Extension and Advisory Services (MEAS) project at the request of Catholic Relief Services (CRS) of India. The scoping team members are deeply indebted to the CRS/India staff, several of whose members participated in the mission, and in particular John Varrier, for his support prior to and during the mission and in subsequent information collection efforts following the mission's fieldwork.

Though he was an integral part of the study team, Dr. Krishna M. Singh needs to be recognized. Dr. Singh used his vast experience and extensive interpersonal networks in Bihar to ensure that the team members were able to identify and meet with all the relevant actors both in and outside of government. His insights and knowledge of the history of extension in India provided invaluable contributions to this study.

Lastly – although too numerous to mention by name – the study team would like to thank all of the government personnel, staff members from non-governmental organizations and cooperatives, and individuals from the private sector, as well as the men and women smallholder farmers who met with the study team and graciously gave their time and shared their knowledge and experiences with the pluralistic extension and advisory services in Bihar, as well as their suggestions on how to strengthen and expand these services in the future. This study is a compilation of the valuable input we received from all those contacted. The authors alone accept responsibility for any shortcomings or factual errors in this report.

EXECUTIVE SUMMARY

Introduction

The Modernizing Extension and Advisory Services (MEAS) project conducted a rapid scoping mission to examine pluralistic extension provisioning in Bihar State, India, at the request of the Catholic Relief Services (CRS) India. The aim was to develop recommendations for strengthening extension and advisory services in support of the Improved Rice-based Rain-fed Agricultural Systems (IRRAS) project, funded by the Bill and Melinda Gates Foundation. The fieldwork for the assessment was carried out from September 24 to October 5, 2012, and included in-depth interviews with Department of Agriculture (DoA) staff members at all levels, international and national non-governmental organization (NGO) staff members, farmers, agricultural researchers and private sector representatives. To the extent possible, interviews were carried out on the "shop floors" of the various respondents, allowing the MEAS team to visit farms, state-, district- and block-level extension offices, research and extension facilities, input dealers and their suppliers. The mission aimed to understand the institutional and organizational landscape, identify the principal actors, ascertain respective resource levels, targets, operational modalities, inter-organizational relationships, areas of conflict and gaps. On the basis of the information collected and observations, the team identified a number of key issues in extension provisioning in the state where the IRRAS project can make valued contributions in strengthening a more sustainable and market-driven system of extension and advisory services.

Opportunities and Recommendations

The assessment provides recommendations related to the IRRAS project's primary objectives to "…establish an adaptive research pipeline…" and "...a knowledge exchange network…" (CRS, 2012), with some additional comments concerning perceived opportunities and threats.

Krishi Vigyan Kendras as the Hub for the Adaptive Research Pipeline

The most appropriate structure to target with project investments in strengthening the technology adaptation pipeline are the Krishi Vigyan Kendras (KVKs). The mandate and activity profile of technology refinement, validation, demonstration and capacity building of the KVKs reflect the IRRAS objectives, and the KVKs' positioning at the district level with deep ties to both the Indian Council of Agricultural Research (ICAR) and State Agricultural Universities (SAUs) and the field programs of the DoA (especially at the level of SMSs and FAs) make them ideally positioned for current demonstration/dissemination activities. That said, the KVKs' varying levels of infrastructure and staffing constrain their capacity to engage as true partners, and alternative solutions will need to be sought until the KVKs are able to fully participate in fieldwork and dissemination efforts with the Subject Matter Specialists (SMSs) and Farmer Advisors (FAs) within the district.

Engaging the Input Dealers

The other major force that can potentially be mobilized in assisting technological change are the estimated 24,000+ retail and wholesale input dealers within the state. To do so effectively, and with an eye for investing in enduring and scalable impact, we advise a multi-phased process. The first step is to ascertain whether and to what degree input dealers' self-interests can be tapped into in attempting to strengthen their capacities as advisory service providers. The National Institute of Agricultural Extension Management (MANAGE) has implemented a one-year diploma training program for input dealers. Since its inception in 2004/05, more than 2,600 input dealers have been trained in Andhra Pradesh and three other states. CRS would be well advised to commission a study comparing changes to the volume and profitability of input dealers participating in this training program with those that have not. A subsample of clients of each dealer type should be included in the survey to gauge differences in their perceptions of the change in the breadth and quality of advisory service communications that they receive from trained versus non-trained input dealers.

Drawing upon lessons from Pradan's influencing of policy-makers in investing in SRI (System of Rice Intensification) technology promotion, CRS should consider investing in efforts to cultivate buy-in of key individuals and organizations to conduct the input dealer study, and to begin working with local partners, such as the Bihar Agricultural Management and Extension Training Institute (BAMETI) and the SAUs, to carry out the study. If the study identifies positive impacts on diploma program participants' profitability, the next step would be to begin designing a program for Bihar state with MANAGE's assistance. The offer to underwrite the first cohort of participants from the IRRAS project's target districts, in particular those areas associated with on-farm demonstrations, would be the next logical step, to be followed with an aggressive public awareness and promotion campaign (especially via radio) as the participating dealers near graduation. The importance of cultivating buy-in from state-level entities lies in triggering a broader capacity-building investment that would not only ensure that IRRAS project objectives are met but that they will be sustained and spread beyond the project's target districts and project duration.

Each of the core technologies targeted by the IRRAS adaptation pipeline efforts – variety demonstration and soil nutrient management – requires its own uptake strategies that address the challenges of increasing immediate availability during the project's lifetime, done in such a way that they will be sustained long after the project ends. In both instances (seeds and soil fertility), strengthening the private sector's involvement and capabilities will be key. Each technology type presents its own challenges. The seed availability issue is perhaps the more delicate because there are state regulations governing the certification and sale of seeds. That said, the DoA's Village Seed and Crash seed dissemination programs have set a precedent of acknowledging and relying on farmers' capacities to multiply, exchange and save seeds. Because of its physiological characteristics, with very low out-crossing, rice is the perfect crop with which to promote local seed multiplication and sales. Though some level of locally

produced seed could be envisioned to pass through input dealers, another strategy is to work with the KVKs and DoA extension staff members to train and provide backstopping to individuals and farmer organizations in establishing commercial seed enterprises. There is a good body of experience, both within India and from other regions (e.g., Beye et al., 2011a, b, c) on the local multiplication and sale of rice seeds that could be used to jump start such an effort. The KVKs and SMSs/FAs, perhaps with funding from BAMETI, would be the appropriate institutional structures to engage in developing such an effort, which would both achieve immediate project goals and establish an institutional base to help maintain the effort after the project terminates.

The second technological target area, improved soil fertility management, will benefit from a different strategic uptake pathway. One way of linking the technology adaptation pipeline and enhanced capabilities of trained input supply dealers would be through developing a Bihar calibrated version of the IRRI Nutrient Manager software. A locally adapted Nutrient Manager, once developed, could be made available, with additional training and backstopping offered by KVK partners, to input dealers graduating from the MANAGE training program as one of the tools they offer customers to help them make important soil amendment purchasing decisions.

A Knowledge Exchange Platform

To help guide its networking investments, the IRRAS project will need to settle on which outcomes it would like to achieve, for each will require a different strategy. Two opportunities in particular warrant consideration. The first is at the state level. The assessment team observed that currently there is no a state-level platform for civil society actors to interact and share their experiences. The lack of a higher-level exchange platform essentially leaves each organization to its own means in identifying and deploying new technologies in its field programs. Even the most effective and best-resourced programs will be less efficient when working in isolation than if it had regular opportunities to exchange lessons learned with a diverse group of similar organizations. CRS, through the IRRAS project, could take leadership in launching such a platform to which representatives from ICAR, the SAUs, BAMETI and other organizations might be invited (e.g., through formation of a Knowledge Exchange Advisory Committee).

The second area where networking investments are needed is at the district level. There is a strong argument to be made for focusing the networking efforts within the Agricultural Technology Management Agencies' (ATMA) Farmer Information and Advisory Centers (FIACs). The risk, however, is that the FIACs do not appear to be functioning at the moment, and with the migration of the FIACs into the e-Kisan (e-Kisan Bhawan), the majority of which have yet to be constructed and equipped, some time may be required before they are truly settled and up and running. The need for short-term actions would favor investments in establishing the KVKs as the institutional host for this function. A purposeful assessment of the status of the e-Kisan and FIAC in the target districts, as well as the KVKs, would be advised before a decision is made.

In any event, the project should not establish a stand-alone networking platform (i.e., not linked with either a KVK or FIAC). Such a platform would be entirely dependent on project funds for its functioning and would likely stop at the end of the project or shortly thereafter. The best chance for establishing an enduring networking function would be to build a networking facility into one of the enduring DoA structures, and to invest available resources in an effort to establish the practice of important partners coming together during the remaining period of project financing. As a means of further strengthening the networking function, the project's communication efforts -- printed materials, use of videos and broadcasting -- should be, to the extent possible, built into its investments in establishing the knowledge exchange platform.

Climate Change Risk, Vulnerability and Resiliency Assessment

The production ecologies and environmental conditions targeted by the IRRAS project warrant explicit attention to climate change impacts. Through the identification and dissemination of submergence- and drought-tolerant crop varieties and complementary management practices, the IRRAS project is making important contributions in helping farmers and key service providers to prepare for future conditions. The project can make further contributions in this critical area by helping key actors prepare longer-term climate change adaptation strategies. A phased approach is recommended, starting with the identification and characterization of the major risks associated with climate change. Secondly, for each of the risks identified, assess the vulnerability of various populations in different locations at varying intervals going forward. If done well, such an investment could provide the groundwork for statewide investments in preparing climate change adaptation plans.

INTRODUCTION

Agricultural extension in India has been extensively studied, and public sector extension efforts are being continually modified. As with other countries, the bulk of agricultural extension and advisory services (EAS) in India, and specifically Bihar State, are provided by public, private and non-profit organizations.[1] Unlike other countries, the depth of investments made by the state exerts a notable influence on the relationships between the state and the interventions of large non-governmental organizations (NGOs). The state currently contracts services with NGOs and the private sector via the many subsidy programs, with some reciprocal influences by these other actors on state policies and operational elements of state programming. The result is that, though some aspects of the public-private-NGO collective exhibit elements of systemic behavior, these dynamics have emerged organically and on the whole are largely unidirectional, driven principally by state influences. The potential for increased and explicit interaction and exchange between these component parts defines the potential for positive synergism; the disconnect defines sources of inefficiencies and conflict of interests.

In the sections that follow, an overview description is provided of the principal actor groups available to meet with the assessment team, followed by a summary of findings and conclusions, and recommendations for strengthening the collective impact of their efforts.

CURRENT EXTENSION SYSTEM PARTICIPANTS, ORGANIZATION AND CAPACITY

Public Sector Extension

The governmental extension system implemented at the state level (e.g., Government of Bihar [GoB]) is without question the largest and only comprehensive extension and advisory service (EAS) provider within the state, employing nearly 3,000 technical and administrative staff members supporting more than 7,000 non-salaried farm advisors (FAs) working directly with farmers at the grass-roots level. Criticism that the system is reaching only a single-digit percentage (estimated at between 0.7 and 1 percent) of the farming households, though indicative, obscures the fact that, with a state population of more than 103 million, 85 percent of whom are rural, the program is reaching hundreds of thousands of households. Given its size the public system eclipses the number of households reached by other dedicated extension efforts by several orders of magnitude (e.g., one of the largest and most respected non-governmental agricultural EAS programs in Bihar, that run by Pradan, has 14 field staff members reportedly reaching 3,000 households per year over the past seven years). In contrast to the EAS initiatives being implemented by (NGOs) and the limited advisory services available through private sector businesses, the GoB system provides, or attempts to provide, extension programming across the full range of technical areas – crops, livestock, fisheries, production and postharvest technologies, use of organic and inorganic inputs, credit access and

[1] Through the remainder of the report, non-profit organizations are referred to as non-governmental organizations (NGOs), even though, in strict definitional terms, NGOs include all organizations outside of government, which is not the intention.

organizational development capacity building. No other entity within the state comes close to the depth and breadth of EAS inputs.

The GoB EAS system is organized along an established administrative hierarchy of state-regional-district-block and Panchayat levels. Operationally, the most important levels are the district, block and Panchayat. At the state level, agricultural extension is constituted as a subprogram of the Agriculture Directorate (combined with Agricultural Engineering) of the Department of Agriculture (DoA). Other technical directorates are Horticulture, Soil Conservation, and Project Planning and Monitoring, although budgetary limitations affect their extension efforts. The director for extension (ADE), assisted by administrative support staff members, oversees the Agriculture Directorate extension system.

The state is divided into nine regions, each administered by a joint director of agriculture and supporting staff (23 staff members total). Each region comprises three to five districts, with 38 districts in total. District-level efforts are overseen by the district agricultural officer (DAO). Each district is further divided into 101 subdistricts, led by one or more subdistrict officers (SAOs), with an additional five to six SAOs posted at the district offices (422 SAOs total). There is a move to establish the post of district agricultural officer – extension (DAOE), but as yet these posts have not been filled. At the district level there are also horticultural consultants (part of the state-level Horticulture Directorate) and National Food Security Mission consultants. There are an estimated 50 horticulture and 100 food security consultants posted at the district level across the state.

Below the district level are the blocks. Each of the 534 blocks is led by a block agricultural officer (BAO). Although formally the BAOs and those reporting to them are under the direction of the block development officers (BDOs), who handle all development activities at the block level, functionally they form part of the agricultural extension chain of command, and technically they are under the guidance of and report to SAOs and DAOs. Within the blocks, working at the Panchayat and village level and reporting to the BAOs, are the subject matter specialists (SMSs), as well as National Horticulture Mission (NHM) consultants. The 8,471 Panchayats are served by approximately 2,400 SMSs and 524 NHM consultants.

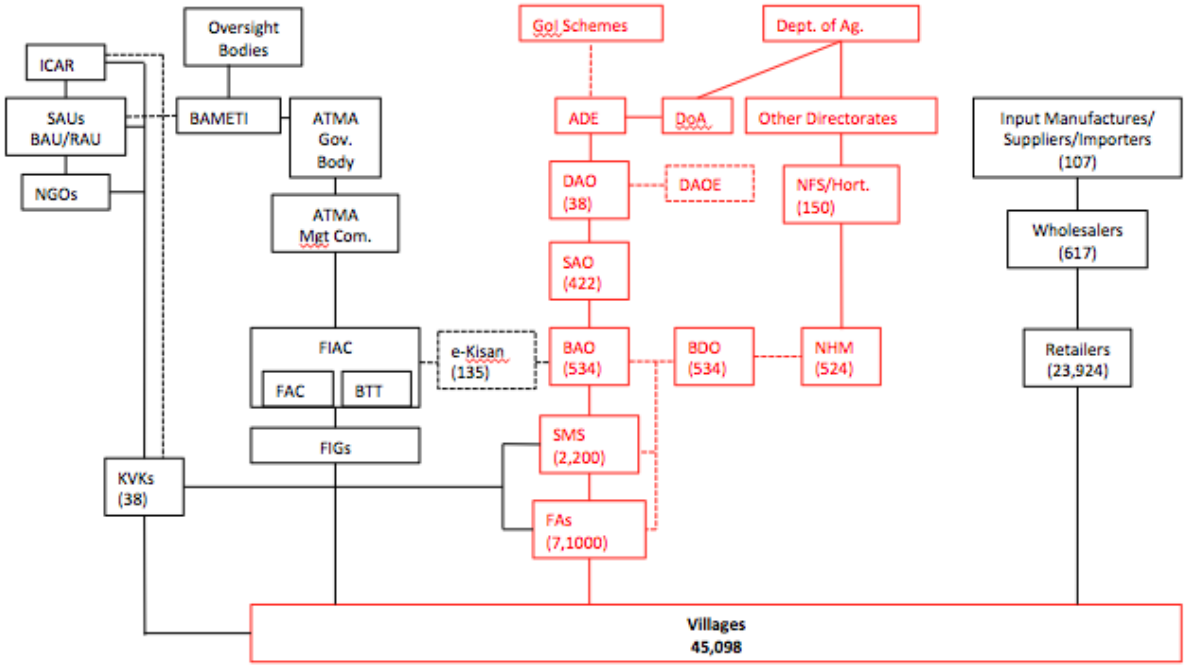
Within the Panchayats, the SMSs both provide direct backstopping to frontline extension agents and assist and lead the establishment of field demonstrations and field trials, among other tasks. Each Panchayat is made up of one to six villages, served by a farmer advisor (FA), the lowest level of the GoB extension system. Approximately 7,100 FAs are posted across the 45,098 villages in Bihar State. Functionally, the FAs' principal responsibilities are to implement the many governmental schemes, the majority of which involve subsidized input distribution that requires administration. The FAs are not salaried employees of the state but receive operational support funds through the various schemes. Currently, the salaries for the SMS

positions are provided through annual contracts administered by a separate program as the DoA prepares for a reorganization of these local levels in EAS provisioning.

> The National Food Security Mission (NFSM) is an initiative supported through the National Agricultural Development Scheme (Rashtriya Krishi Vikas Yojana, RKVY). With the launching of the RKVY in 2007, the NFSM was created to stimulate the increase of wheat, paddy and pulse production by 4% annually with the objective of making the state, as well as country, self-sufficient in cereal grains and pulses. The states targeted through the NFSM are those where crop productivity has been poor and within selected state only those districts where crop productivity is underperforming. Starting in 2010-11 the pulses program (Integrated Scheme of Oilseeds, Pulses, Oilpalm and Maize) was merged with the NFSM and consequently lead to more emphasis being placed on promoting the production of pulses in the NFSM program. The NFSM program now covers all districts within Bihar State.

Another key structure of the central DoA EAS system is the Krishi Vigyan Kendra (KVK). The KVKs serve as agricultural technology testing, dissemination and training hubs. There are 38 KVKs in the state, one located in each district. The first KVK in Bihar State was established in 1979, with two more added during the '80s, another 10 in the 1990s and the remainder after 2000. Each KVK is supposed to be situated on 10 to 20 ha of land and includes physical infrastructure (offices, laboratories, training and other functional facilities) and staff. The staffing of the KVKs is based on a model of 16 positions -- 10 scientific and technical staff members and six administrative staff members. The formal KVK mandate is to collaborate with researchers of the state agricultural universities (SAU), the Indian Council of Agricultural Research (ICAR) and extension personnel of allied state departments in on-station and on-farm testing and refinement of new technologies; organize and conduct training of extension field staff members; organize and provide long-term farmer training programs, especially targeting youth and women; and organize on-farm trials and farmer demonstrations on new technologies and provide farmers' feedback to ICAR and SAU researchers (Kisan Ayog, 2008).[2]

[2] Additional information on the KVK system is available at: http://www.icar.org.in/krishi-vigyan-kendra.htm



The KVKs also provide crop diagnostic services to farmers within the district. In addition, the KVKs use a significant portion of their lands to multiply seeds of improved varieties and propagate planting material to sell to farmers as a means of partially supporting their operations (approximately 5 to 10 percent of their operating costs are supported in this way).

KVK technical staff members sequence their mandated technology testing and dissemination activities as follows:

- SMSs select representative villages within the district where they conduct participatory rural appraisals and rank constraints with farmers;
- SAU and ICAR researchers are then consulted on potential solutions, and on-station testing of responses are carried out;
- if successful, technologies then move to on-farm trials (with progressive farmers), with technologies subsequently being rolled out in district-wide demonstrations.

The on-farm trials and district-wide demonstrations are organized with the DoA SMSs. Collaboration on technology assessment and refinement efforts, training (vocational, women, extension staff members and functionaries) and seed production (breeder, foundation and maize hybrids) comprise the core technology transfer efforts. Overall, training is the primary function carried out by the KVK. In support of this function, some of the more recently constructed KVKs are equipped with video conferencing facilities and are experimenting with local radio broadcasting.

Funding for the KVK system comes from the ICAR. ICAR also provides direct technical backstopping and staffing to one KVK; the remainder receive their support through subcontract agreements with Rajendra Agricultural University (RAU) and Bihar Agricultural University (BAU), which support 10 and 21 KVKs, respectively, with an additional six KVKs receiving support from subcontracted NGOs with oversight provided by BAU and RAU.

In addition to these central structures of EAS delivery, several other entities provide important support services in the overall provisioning of the EAS within the state. One is the Bihar Agriculture Management, Extension and Training Institute (BAMETI), funded through the Ministry of Agriculture. Originally housed at the RAU, BAMETI has established itself as an autonomous body now located in the capital city, Patna. Modeled on the National Institute of Agricultural Extension Management (MANAGE), BAMETI serves as a funding pipeline and coordinating body for extension training and communication resource capacity-building activities within the state. Each year during the March/April period an interdepartmental working group at the state level drafts a statewide training calendar. The management team then seeks resource persons from the SAUs, ICAR and KVKs to deliver the planned training programs. BAMETI also has control over a sizable discretionary account that it uses to support supplemental activities in addition to those identified in the annual workplan. In addition to training programs and materials, BAMETI also contracts the preparation of communication materials (printed and broadcast) and commissions various types of assessments and planning studies in support of partner institutions and state-level policy-makers. BAMETI's activities are currently implemented by a small headquarters office made up of a director, an assistant and support staff members. Plans are to fill a total of 12 Master's of Science (M.Sc.) level technical posts (two are appointed currently), representing each of the contributing departments, along with completing construction of a new office complex in Putna.

One of BAMETI's major activities is overseeing the implementation of the Agricultural Technology Management Agency (ATMA) in Bihar State. The ATMA was envisioned to serve as an independent entity similar to BAMETI. After the pilot phase, however, each state was free to determine the mechanism through which the ATMA would be implemented. In Bihar State, the ATMA was established not as a separate agency but as a DoA program administered by BAMETI. The ATMA model was developed in 1998 through the Innovations in Technology Dissemination component of the World Bank-funded National Agriculture Technology Project, and was initially piloted in Bihar and two other states. Its job is to integrate extension programs across line departments, link research and extension activities within each district, and decentralize decision making through bottom-up planning procedures (Singh, n.d.).

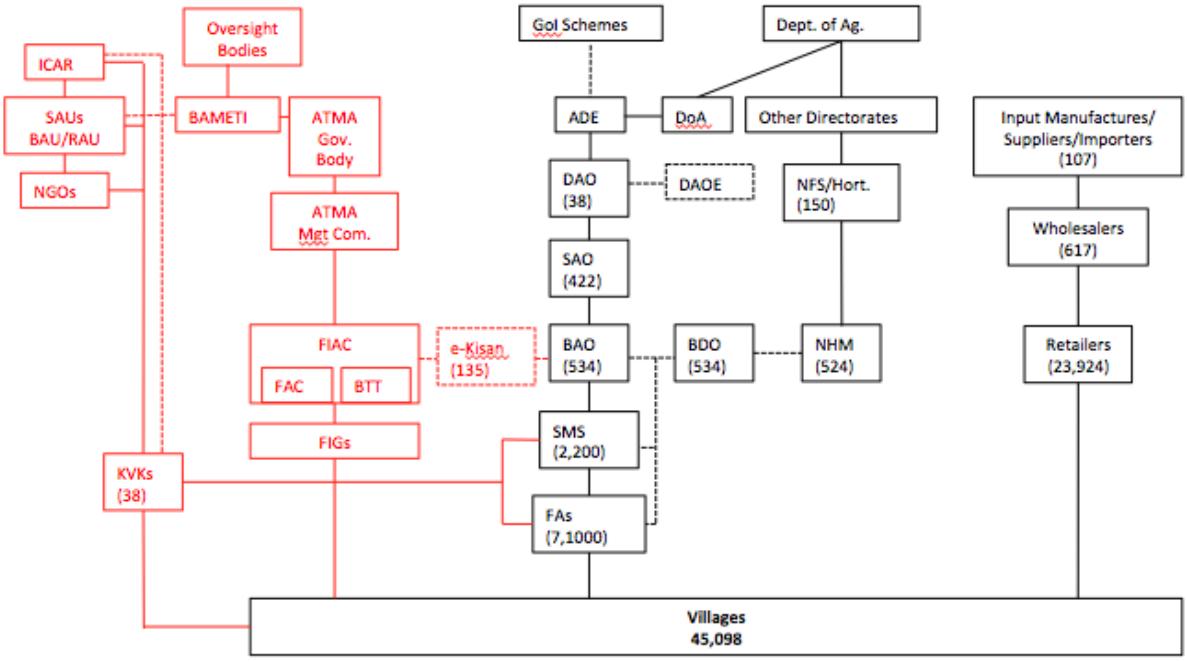
At the state level, the ATMA program is administered by BAMETI as approved through the agricultural commissioner, state-level sanctioning committee and interdepartmental working group. The primary operational bodies of ATMA are found at the district and block levels. At the district level are the ATMA governing board and management committees. The governing

board, chaired by the district magistrate and made up of a 50:50 split of governmental and non-government representation (including farmer representatives, of whom 30 percent are to be women), reviews and approves the aggregate strategic research and extension plan and annual action plans of the district and transmits these on to the state level, where they are used in formulating the state extension work plan. The ATMA management committee, intended to be chaired by the ATMA district project director (currently filled by DAOs in most districts) and comprising heads of all line departments in the district and one farmer representative, oversees the preparation of the strategic and annual action plans and their implementation. Management of ATMA program is to be supported by an eight-person staff at the district level – project director and secretary, two deputy project managers, and four technical and administrative staff members.

At the block level, the ATMA program is constituted in the farmer advisory committee (FAC), an all-farmer committee with approximately 16 members, 30 percent of whom are to be women, and the block technical team (BTT), led by a block technical manager, the only salaried ATMA staff person at the block level (these positions are not yet filled and being served by the BAOs). The BTTs are responsible for developing the block action plans and overseeing their implementation, under the oversight and approval of the FAC. In addition to providing feedback on the running of ATMA-sponsored programs, the FAC identifies block-specific programs. Membership of the FAC is drawn from the leadership of commodity-based, village-level farmer interest groups (FIGs) that are federated within the block and district levels. The FAC and BTT are housed within the Farm Information and Advisory Center (FIAC), under the management of the BAO. FIACs have been established in most blocks and are currently being incorporated into the e-Kisan Bhawan that are being constructed under BAMETI's management. So far, 135 of the planned 534 e-Kisan centers have been established, with the remainder slated for completing in the next 1 to 1.5 years. Each e-Kisan center will house the FIAC, a soil testing lab, a training center, a farmer dormitory, a plant protection center, an information technology and market intelligence center, an agricultural machinery bank (for custom hiring), a weather information center and the BAU administrative offices. The overall intent of the FAC, BTT and FIAC is to facilitate a bottom-up planning process and corresponding downward flow of resources to implement the plans, as well as oversight functions to ensure that work is completed satisfactorily.

The Rajendra and Bihar agricultural universities (RAU and BAU) complete the core components of the public sector EAS system. In addition to their EAS teaching and degree-granting functions, SAU faculty members are involved in conducting agricultural research and assisting extension efforts from their respective campuses and through the KVKs. Technology transfer activities are led by a director of extension education (DEE). The DEE is also the controlling officer of the KVKs under the control of each university. As mentioned above, the universities provide the staffing and technical backstopping to the majority of the KVKs in the state, with RAU managing 13, two of which are administered by NGOs, and BAU managing 25, four of

which are implemented by NGOs. Because of student unrest during the time of the field mission, it was not possible to visit the BAU campus as anticipated.



Outside of these central structures and programs providing the core of agricultural extension and training efforts in the state, there are also primary agricultural cooperative societies (PACS). The PACS are an initiative of the GoB for purchasing grain at a minimum support price. The purchased grain is then transferred to the Food Corporation of India, which serves a price stabilization function and maintains buffer stocks and supplies the Public Distribution System. The PACS do not serve an extension role, though they provide seed and inputs to farmers through a credit scheme. Many are not functional, and the GoB is working to revive them.

NGOs

In comparison with other regions, especially Africa, where MEAS has conducted assessments, the NGO presence in Bihar State, and in particular within the agricultural sector, is noticeably thin. There are relatively few NGOs working in the sector, and the size of their agricultural programs is very modest. That is not to say that they are insignificant -- in at least one instance, the work of Pradan, they have had a major impact on policies at the state level; in this instance successfully promoting the adoption of the System of Rice Intensification (SRI) approach that Pradan had been extending through its field programs. In general, the NGO-run agricultural programs are small, directly employing seven to 14 field staff members and working through a larger cadre of trained volunteer farmers at the village level. The largest NGO programs in the state, those run by the Aga Khan Rural Support Program (AKRSP), Pradan and CRS, all have close working relations with the DoA and are involved in assisting technology demonstrations and the

roll-out of new technologies. AKRSP and Pradan are contractually engaged by the GoB in project implementation. Other NGOs, such as Digital Green, provide EAS support services -- in this case, videos -- without directly engaging in independent frontline extension fieldwork themselves. The Digital Green mandate is to work only in contexts with operational extension programs.

Private Sector

Private companies, as would be expected, have come to occupy the majority of the market space within the agricultural sector in both the buying of produce and selling of inputs. That said, the influence of GoI procurement and the many subsidy programs have served to reinforce and strengthen grain purchasing and input distribution networks, and in some respects it is difficult to perceive what the sector would look like were the GoI less involved or absent altogether. All relevant GoI schemes maintain a list of approved subsidized inputs (products and brands) including varieties, fertilizers, agrochemicals and equipment. The subsidy levels and volumes are significant and, as intended, exert a measurable influence on farmer purchasing behavior (even discounting purchases that are destined for resale locally and onward movement across the border into Nepal). For input suppliers, the inclusion of their products in the subsidy programs has direct implications for their bottom line. For wholesalers and retailers, the subsidy lists shape the demand for specific products. The presence of the GoI as a buyer in the produce markets (via the credit, input-supply, and grain-sale program run through the PACS) has perhaps less influence yet serves to establish a price floor, which provides farmers with more certainty than they would otherwise experience, as well as an alternative means of accessing inputs for those not selected to receive subsidized inputs through one or another of the schemes. From an EAS perspective, the importance of these observations is not the extent to which the GoI policies are influencing the market behavior of individual farmers but rather the resulting increase in farmers' contact with retailers and the importance of the role played by input stores and wholesalers as purveyors of product information.

As of 2012, there were 617 wholesalers and 23,924 licensed retailers in Bihar State, in addition to 107 agricultural input supply companies.[3] An estimated 2,000 input dealers exist in the IRRAS target districts (Aurangabad, Sitamarhi, West Champaran). These retails shops are provisioned either by a local wholesaler or directly through the limited number of agrochemical manufacturers and import suppliers. A few wholesalers have retail stores, but the majority of the retail shops are independently run. In addition to the physical products, shopkeepers sometime receive pamphlets and factsheets on the products with which they are supplied, which they display and pass on to farmers. The larger wholesalers are provided with annual training by some of their main suppliers, and they in turn provide annual training workshops on new products for the retailers that they service. Certain suppliers have staff members at the

[3] http://krishi.bih.nic.in/15may2012/Licence%20ki%20Shankhya.pdf.

Panchayat level who promote their products, establish demonstrations and provide limited training to farmers, though they do not engage in direct farm-level sales so as not to compete with their retailer base. Retailers have a list of approved products covered under the various GoI subsidy schemes and their fixed prices. A separate receipt book is used to track sales, which is turned into the DAO for reimbursement.

FINDINGS AND CONCLUSIONS

Policies and Funding

The most important finding related to the DoA EAS programming is the extent to which extension activities are being driven by state and national agricultural policies as articulated through the various agricultural schemes emanating from state- and national-level planning bodies (see Annex D for description of the major schemes). The nearly dozen major schemes either include direct subsidization of inputs and equipment or earmark funds for technology demonstrations and promotions, both of which are implemented by the SMSs and FAs under the DAO-BAO line of command. The DAOs and BAOs interviewed described the process whereby predetermined targets of the various schemes are allocated across the Panchayats on the basis of land area and population levels and passed on to SMSs and FAs for implementation. The weekly and bi-weekly meetings of field staff members at the block and district levels are focused on reporting achievements toward the scheme targets.

Particularly with respect to the intents and design of the ATMA program, this tendency toward organizing EAS efforts around centrally planned initiatives and priorities runs in direct opposition to the prospects of establishing, coordinating and maintaining a decentralized, demand-driven EAS program. None of the DoA field staff members indicated that the bottom-up planning process of the ATMA program, as originally designed and piloted, was functioning. Furthermore, the DAOs characterized the situation as being one where all resources for EAS activities were tied to the implementation of the schemes. The operational support of the non-salaried FAs, for example, is reportedly tied to the various schemes. Local planning, to the extent that it was carried out, was described as an exercise of prioritization of scheme-supported activities as opposed to a more open assessment of local needs, opportunities and priorities. For all the rhetoric to the contrary, this tendency toward centrally determined programming is not necessarily different in the case of NGO projects, where, because of limitation of technical competency, ideology or more often donor priorities, thematic foci and targets are established without a means of active local influence and control. Actors within the private sector, if they are to thrive, respond to the effective demand of their clients from among the products they have to offer. Farmers' demands are linked to a certain level to the subsidies offered through the GoI schemes.

Human Resources, Infrastructure and Operational Support

Human resource constraints present perhaps the most pressing need within the GoI EAS system. All of the key EAS operational structures and programs contacted reported significant staff shortages. Within the DoA hierarchy, the majority of the 38 DAO-E positions are vacant. Figures from the 2012 Bihar Agricultural Road Map (GoI, 2012) indicate that more than 1,800 SMSs remain to be recruited, along with nearly 1,400 FAs (referred to as Kisan Salahkar under the new plan). Current vacancy levels among the FA and SMS ranks averaged 10 to 20 percent and were up to 35 percent in those blocks visited. None of the KVKs visited were fully staffed, with three, four and seven of the 10 scientist positions vacant. The ATMA program has yet to hire any of the envisioned 534 block technology managers, and only two of 12 department posts within BAMETI's headquarters are filled. The SAUs are also reportedly understaffed and are actively recruiting, though specific numbers were not obtained.

In addition to staff numbers, at the level of the FAs the adequacy of both pre-service education and in-service training is also a concern. The vast majority of FAs are "progressive farmers" and/or those with a general science senior secondary school education (Indian School Certificate) with no specialized agricultural training. Reference was made to a 30-day refresher "batch" training course for FAs conducted by the KVKs, but none of those interviewed had participated. Most of their technical information was received via booklets, brochures and pamphlets distributed by the BAOs and short technical workshops conducted by KVK scientists related to the various GoI schemes that they are responsible for implementing. Some FAs reported that their BAO had additional materials that they could borrow; others mentioned buying books on their own. None of the FAs interviewed had received any training in extension methods or techniques. The practice of placing the primary extension personnel in the field with neither the necessary educational background nor training in the basic tools of their craft is a glaring weakness of the DoA system. At the state level, the ADE stated that, though human resource development was a noted and critical problem within the agency, at present there is no comprehensive capacity-building plan. Outside of the DoA EAS system, the education levels of staff members within the few NGO programs contacted appear higher -- generally master's degree level -- though these programs involve far fewer staff members (single- or low double-digit numbers versus thousands). Private sector input retailers generally hold secondary school certificates.

An additional note is warranted regarding the SMSs. Despite their title, the SMSs are anything but specialists -- they simply have a more advanced level of training (most with Bachelor of Science degrees and a few up to the M.Sc. level) than the FAs. (A majority of the BOAs have the same ISC education level as the FAs, having been promoted from the ranks of the former village-level workers, a position now dissolved.) All those interviewed had general agriculture degrees and no further specialized technical training, nor were their work tasks segregated into specialized domains -- most of their time was spent administering the various governmental schemes. Thus for frontline staff members to get any specialized attention, queries from either

the FAs or SMSs needed to rise to the level of the KVK, which, given the high levels of post vacancies, meant that in reality field staff members may need to identify and contact staff members at one or another of the external research partners, the SAUs or ICAR.

Among those staff members in place, the gender balance within staffing lines of the DoA EAS system reflects an overall low level of women professionals, with the male/female ratio generally increasing the lower one goes in the hierarchy. In the districts visited, only one woman was identified within the DAO-SAO-BAO-SMS ranks. Only at the level of FA are notable numbers of female staff members found, and then in the 5 to 10 percent range. The reasons stated varied and included lack of trained women, women's lack of awareness of job openings and reluctance of women's families to allow them to take jobs outside of their home Panchayat. The generally held assumption that NGOs have a far more gender-balanced profile among their field staff is not borne out in fact, or only weakly so, in those programs contacted. With vastly fewer employees than the GoI system (<.2 percent), those NGOs contacted with agricultural programs (discounting women-only targeted programming) had only single-digit differences in the percentage of female staff members. No female employees or owners were identified within the private sector entities contacted during the fieldwork.

The status of facilities, equipment and operational support to the GoI EAS program is mixed. The district and block offices varied in their state of repair; those offices relocated to the newly constructed e-Kisan facilities were in the best condition, if not yet fully furnished. Even here, however, there are early signs of neglect and general disregard for the properties (e.g., spitting betel nut juice into corners, uncollected litter within the buildings). The KVKs visited also ranged widely in their state of repair, from highly degraded facilities to those that are very modern and up-to-date, including video conferencing facilities and radio broadcasting capabilities. The KVKs are eligible to receive a one-time grant from ICAR for the construction/repair of buildings and purchase of equipment. The SAUs are then responsible for maintenance and staffing of the facilities, which in most cases have not received the attention needed, thus putting into question the level of commitment in making the KVKs vibrant frontline institutions for EAS. The NGO offices visited offered adequately furnished rental space with all the necessary equipment and materials. Those of the retailers and wholesalers tended to be cramped, affording little more than space to display and store their inventory and conduct transactions.

The SMSs and FAs are provided a monthly stipend as part of their support to cover their transportation and communication needs. In addition, SMSs must provide for their own transportation, the ownership of which can serve as a hidden factor in recruitment. Those interviewed reported that the stipends were grossly inadequate, given their travel demands. SMSs and FAs attend weekly meetings with the BOA and bi-weekly meeting with the DAO. SMSs also carry out daily visits within the two to three or up to six Panchayats where they work, and FAs visit with farmers in up to five villages in their work areas. All of the DoA field staff

members used their personal cell phones for communicating with their superiors, KVK, ICAR and SAU scientists, and farmers. In this regard field staff members of NGO programs tend to be vastly better provisioned through their project contracts. Private input dealers are in the enviable position of having their clients come to them. The input suppliers/manufacturers reported running promotional campaigns at the Panchayat level, involving mobile teams using loudspeakers, banners and fliers to advertise and promote their products.

ICT Utilization

As referenced above, the use of various information and communication technologies (ICTs) was identified down through the ranks of the DoA EAS system. In addition to printed materials (booklets, pamphlets, factsheets) produced by KVK, SAU and ICAR scientists under contract to and printed and distributed by BAMETI, field staff members at all levels mentioned the recent addition of audio/visual resources, especially those used in the training sessions offered through the KVKs. Internet access was said to be available down to the BDO level but not to the BAO, and was not available to SMSs and FAs. All extension staff members down to the SMSs were to have been supplied with SIM cards provided by IFFCO under contract with DoA through which they can receive technical messages, although some of those interviewed were unaware of the SIM cards. Most of those interviewed, however, reported not using the cards because they needed to purchase the airtime for the new number out of their monthly salary and stipend.

An IFFCO subsidiary, IFFCO Kisan Sanchar Kendra, runs one of two farmer call centers that are operating in Bihar. The other call center, run by ICAR, went into operation in 2010 and provides three levels of technical expertise in responding to farmers' questions – those answering the call center phone, additional experts on-call to answer more detailed or challenging questions, and the analysis of physical samples brought to the call center, with call-back responses given. The center is open 1000 – 1700 on Fridays only. The moderate call volume initially (10 to 15 calls weekly) has declined significantly to only two to three calls on operating days. The chief reason for the decline appears to be that there is no toll-free line, so farmers need to pay for the calls. In contrast, the Kisan Call Center (KCC) run by IFFCO has toll-free lines, in addition to being open from 0600 – 2200 throughout the week. The KCC, which is financed by the DoA and supported by ICAR and the SAUs, has been in operation since 2004 and receives 600 to 700 calls per day. To handle this call volume, the KCC maintains three shifts of call respondents and also uses a three-tier response system -- on-site staff members, SMS and ICAR/SAU/other experts -- but it does not accept physical samples.

Through the ATMA program, the DoA funds three experimental short-range FM community radio stations in Bihar State, all located at KVKs. The team was able to visit one of these stations during a follow-up visit, but unfortunately the station was not in operation because of problems with its transformer. The other two stations were also not functioning due of other problems. It should be noted that technical problems of this nature have also been a common

source of weakness in higher-end ICT efforts, such as the e-Choupal Internet kiosks providing price information and purchasing opportunities to farmers, which have fallen into disuse because of disruption in electrical supply. Other problems noted are the lack of operational funds and training and support for those responsible for operating the kiosks. The pilot KVK stations, when functional, offer a one-hour program on weekdays broadcast in the morning and repeated in the evening. The program is divided into three parts: 35 minutes of technical information, 15 minutes of entertainment (e.g., folk music) and 10 minutes of programming targeting women and children. The contracted operator, World Development Foundation, unfortunately does not have an agricultural background and does not work in close partnership with the KVK in selecting and developing content but reports directly to BAMETI on a semi-annual basis. Though there appears to be great potential in using the radio medium for EAS communication and the creation of more stations is planned, the current efforts seem to be underutilizing this opportunity to have appreciable impact. The team was unable to establish contact with the national All India Radio, which broadcasts one-hour agricultural programs, Choupal and Khet-Bari, through its network of stations across Bihar State, or the Doordarshan television program whose programming of Krishi Darshan is supported by MANAGE and the national broadcasting agency. In addition, some private television stations, such as ETV, also broadcast agricultural programs.

Private Sector EAS

A cursory examination of the raw survey data collected by Indo-Gulf Fertilizers from their contact farmers suggests that the vast majority of smallholder farmers surveyed obtain their agricultural advice from input shop dealers. Confirmation of this as the norm within the IRRAS project districts is warranted, but the implications are that input shop dealers could become a powerful force in advisory service communications for certain types of information. Those wholesalers and retailers interviewed and, by extrapolation, the vast majority of those in the state have low education levels, with little or no specific agricultural training, and are simply running retail shops and living on the sales margins of the products they offer. A few celebrated counter-examples illustrate the potential that dynamic input dealers can have as advisory service providers. These cases need to be recognized for what they are -- unique outliers, perhaps one in a thousand examples. The team was unable to identify and contact any other important actors during the field mission, especially any farmer cooperative structures (outside IFFCO) or commercially oriented associations that might be offering EAS to their members.

For those that were contacted, using even a modest multiplier on the potential number of contacts an individual retailer makes, the large number of licensed shop owners (24,000+) and the thousands of retailers selling agricultural equipment and inputs yields a small army of potential EAS communicators who, if sufficiently trained and supported, represent a substantial untapped asset with the capacity for wide-reaching impact.

The challenge in realizing this potential lies in two areas. The first is in developing the perspective among shop owners that providing advisory information is in their own self-interest, perhaps even providing them with a competitive advantage over other vendors not providing such services. Second, the information communicated must be accurate and non-biased. The first challenge can be addressed through a follow-up assessment on the benefits accrued to participants in the Diploma in Agricultural Extension Services for Input Dealers (DAESI) Program piloted by MANAGE, which, if positive, could be promoted and strengthened through targeted information campaigns. The second challenge is more problematic. The accuracy of information provided by retailers can be addressed through a basic training program and a system of follow-up support. The provision of non-biased information runs headlong into the interests of wholesalers and product suppliers/manufacturers to increase the volume of sales of their products. The ability of manufacturers and, in turn, wholesalers to use price and other terms of trade at their disposal to induce and influence retailers to promote specific brands and products, irrespective of farmer-consumer welfare and interest, is one area where blind faith in the private sector serving as a benevolent EAS actor in a competitive market environment falls short.

A critical role remains to be played by the public sector research and extension system in conducting the necessary trials and making the results available in a way that undercuts efforts to steer farmers to specific products/producers based on profit motives, as well as in guiding the selection of materials for inclusion in the state subsidy programs. The formulation of a comprehensive, balanced strategy building on the different strengths of private and public sector entities can address many of these issues, but this will need to be done purposefully from the outset.

Another area that will require explicit attention is recognition of the limitations on types of information that private retailers can realistically be expected to communicate to their clients/customers. Two dimensions seem important: the education levels of the shopkeepers and their knowledge of agriculture, natural resource dynamics and economic considerations, and their ability to grasp and effectively communicate more nuanced technical information; and retailers' self-interest in making sales that contribute to their profitability as a commercial enterprise. In general, input dealers should not be expected to be an important purveyor of complex information and that which is not linked to product sales or that may even supplant external input usage with more knowledge- intensive, biologically based management options. Acknowledgement and careful alignment of interests and expectations will be needed if the private sector is to become involved in EAS provisioning in a constructive manner.

RECOMMENDATIONS

Recommendations are provided here in relation to the IRRAS project's primary objectives to "…establish an adaptive research pipeline…" and "...a knowledge exchange network…" (CRS, 2012), with some additional comments concerning perceived opportunities and threats.

KVKs as the Hub for the Adaptive Research Pipeline

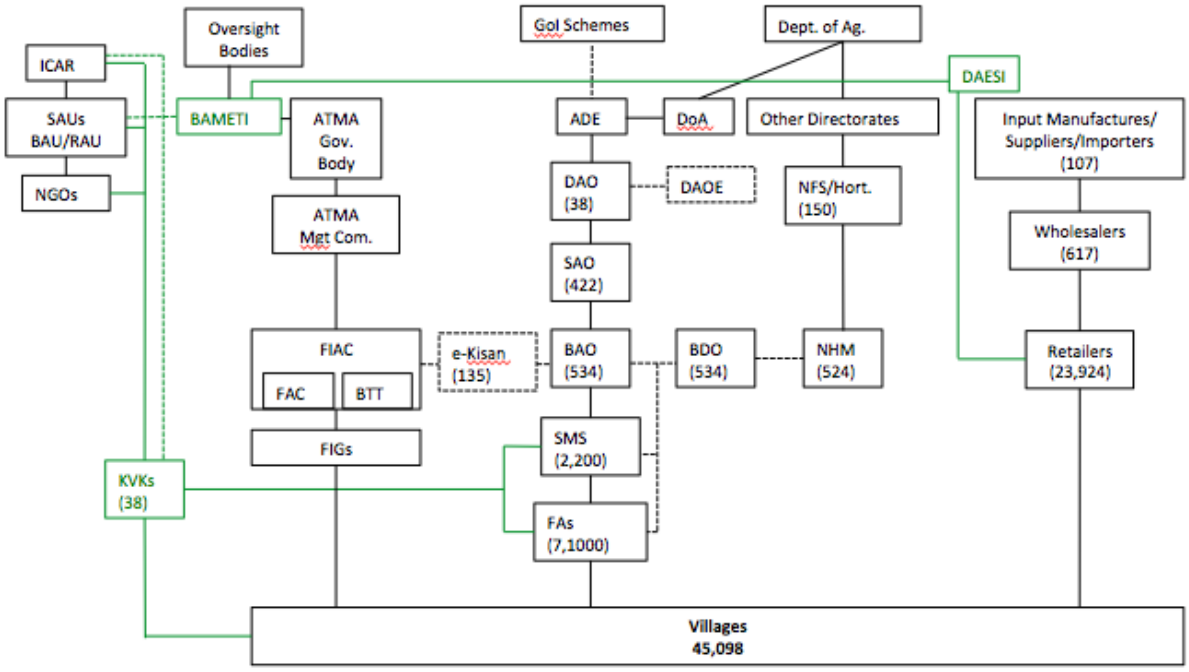
All things considered, the most appropriate structure to target with project investments in strengthening the technology adaptation pipeline are the KVKs. The mandate and activity profile of technology refinement, validation, demonstration and capacity building of the KVKs reflect the IRRAS objectives, and the KVKs' positioning at the district level with both deep ties to the ICAR and SAUs and to the field programs of the DoA (especially at the level of SMSs and FAs) make them ideally positioned for current demonstration/dissemination activities. That said, the KVKs visited had varying levels of infrastructure and staffing that shape their capacity to engage as true partners. Particularly in the case of the KVK at Madhopur, West Champaran, but true for many KVKs across the state, low staffing levels will constrain efforts, and alternative solutions will need to be sought until the KVK is able to fully participate in fieldwork and dissemination efforts with the SMSs and FAs within the district.

Engaging the Input Dealers

The other major force that can potentially be mobilized in assisting technological change is the 24,000+ retail and wholesale input dealers in the state. To do this effectively and with an eye for investing in enduring and scalable impact, a multi-phased process is advised. The first step is to ascertain whether and to what degree input dealers' self-interests can be tapped into in attempting to strengthen their capacities as advisory service providers. The MANAGE has implemented an innovative one-year DAESI training program that appears very useful. Since its inception in 2004/05, more than 2,100 input dealers have been trained in Andhra Pradesh, with another nearly 500 trained in pilot efforts in the states of Tamil Nadu (63; 2005-08), Maharashtra (33; 2008-10) and Orissa (400; 2012). CRS would be well advised to commission a study comparing changes in the volume and profitability of the businesses of those input dealers participating in this program with those that have not. A subsample of clients of each dealer type should be included in the survey to gauge differences in their perceptions of the change in the breadth and quality of advisory service communications that they receive.

Drawing on lessons from Pradan's success in influencing state policy-makers to invest in SRI technology promotion, CRS should consider investing in efforts to cultivate buy-in of key individuals and organizations in, first, conducting the DAESI impact study (with CRS perhaps offering to provide funding, if resources are an issue), and to begin working with logical partners, such as the BAMETI and the SAUs, to carry out the study. If the study identifies positive impacts on diploma program graduates' profitability, the next step would be to begin designing a program for Bihar State with MANAGE's assistance. The offer to underwrite the

first cohort of participants from the IRRAS project's target districts, and in particular those areas associated with on-farm demonstrations, would be the next logical step, to be followed with an aggressive public awareness and promotion campaign (especially via radio) as the participating dealers near graduation. The importance of cultivating buy-in from state-level entities lies in triggering a broader capacity-building investment that will not only ensure that IRRAS project objectives are met but that they will be sustained and spread beyond the project's target districts as well.



Each of the core technologies targeted by the IRRAS adaptation pipeline efforts -- variety demonstration and soil nutrient management – will need its own uptake strategies that address the challenges of increasing their immediate availability during the project's lifetime, done in such a way that they will be sustained long after the project ends. In both instances (seeds and soil fertility), strengthening the private sector's involvement and capabilities will be key. Each technology type presents its own challenges. The seed availability issue is perhaps the more delicate because there are state regulations governing the certification and sale of seeds. That said, the DoA's Village Seed and Crash seed dissemination programs have set a precedent of acknowledging and relying on farmers' capacities to multiply, exchange and save seeds. Because of its physiological characteristics, with very low out-crossing, rice is the perfect crop with which to promote local seed multiplication and sales. Though some level of locally produced seed could be envisioned to pass through input dealers, another strategy is to work with the KVKs and DoA extension staff members to train and provide backstopping to individuals and farmer organizations in establishing commercial seed enterprises. There is a

good body of experience, both within India and from other regions (e.g., those produced by AfricaRice, Beye at al., 2011a,b,c) on the local multiplication and sale of seeds that could be used to jump start such an effort. The KVKs and SMSs/FAs, perhaps with funding from BAMETI, would be the appropriate institutional structures to engage in developing such an effort that would both achieve immediate project goals and establish an institutional base to help maintain the effort after the project terminates. Though the project will need to focus on the multiplication and dissemination of a limited number of varieties during the time remaining, by helping to establish a system of local seed producers as a commercial enterprise, the project will lay the groundwork for the injection of additional varieties in the future, at least some of which would be expected to be products of the technology adaptation pipeline.

The second technological target area, improved soil fertility management, will benefit from a different strategic uptake pathway. One way of linking the technology adaptation pipeline and enhanced capabilities of trained input supply dealers would be through developing a Bihar calibrated version of the IRRI Nutrient Manager software. A locally adapted Nutrient Manager, once developed, could be made available, with additional training and backstopping offered by KVK partners, to input dealers graduating from the MANAGE training program as one of the tools they offer customers in helping them make important soil amendment purchasing decisions.

A Knowledge Exchange Platform

To help guide its networking investments, the IRRAS project will need to settle on which outcomes it would like to achieve because each will require a different strategy. There are two opportunities in particular that warrant consideration. The first is at the state level. The assessment team observed that there is not currently a state-level platform of civil society actors. The lack of an exchange platform essentially leaves each organization to its own means in identifying and deploying new technologies in its field programs. Even the most efficient and best-resourced programs will be less efficient when working in isolation than if they had regular opportunities to exchange lessons learned with a diverse group of similar organizations. CRS, through the IRRAS project, could take leadership in launching such a platform (e.g., Knowledge Exchange Advisory Committee) to which representatives from ICAR, the SAUs, BAMETI and other organizations might be invited.

The second area where networking investments are needed is at the district level. There is a strong argument to be made for focusing the networking efforts within the ATMA FIACs. The risk, however, is that the FIACs do not appear to be functioning at the moment, and with the migration of the FIACs into the e-Kaisan (e-Kisan Bhawan), the majority of which have yet to be constructed and equipped, some time may be required before they are truly settled and up and running. The need for short-term actions would favor investments establishing the KVKs as the institutional host for this function. A purposeful assessment of the status of the e-Kisan and FIAC in the target districts, as well as the KVKs, would be advised before a decision is made. In

any event, the project should not establish a stand-alone networking platform -- i.e., not linked with either a KVK or FIAC. Such a platform would be entirely dependent on project funds for its functioning and would likely stop functioning at the end of the project or shortly thereafter. The best chance for establishing an enduring networking function would be to build a networking facility into one of the enduring DoA structures, and to invest those resources that are available in an effort to establish the practice of important partners coming together during the remaining period of project financing. As a means of further strengthening the networking function, the project's communication efforts (printed materials, use of videos and broadcasting) should be, to the extent possible, built into its investments in establishing the knowledge exchange platform.

[As an aside, in one way the creation of the e-Kisan is unfortunate because they duplicate some of the important functions of the KVK (e.g., as training centers). Viewed somewhat differently, a better strategy may have been to invest the resources in enlarging the KVKs' functioning and bringing them up to a higher standard of operation. By bringing the administrative home of district-level extension programming into the KVKs instead of the newly constructed e-Kisan, such a decision would also have made important advances in closing the gap between research and extension.]

Climate Change Risk, Vulnerability and Resiliency Assessment

The production ecologies and environmental conditions targeted by the IRRAS project warrant a final word about climate change impacts. The major threats of global climate change are rising temperatures and an increase in disruptive events, in particular floods and droughts. Through the identification and dissemination of submergence- and drought-tolerant crop varieties and complementary management practices, the IRRAS project is making an important contribution to helping farmers and key service providers prepare for future conditions. The project can make a further contribution in this critical area by explicitly helping key actors prepare a long-term climate change adaptation strategy. Here, too, a phased strategy is recommended, starting with the identification and characterization of the major abiotic and biotic risks associated with climate change. Secondly, for each of the risks identified, assess the vulnerability of various populations in different locations at varying intervals going forward. Depending on the findings of the assessment, the IRRAS project should consider including additional adaptive measures that reduce risk exposure (vulnerability) and increase resiliencies of those in target areas into its implementation plans. If done well, such an investment could provide the groundwork for statewide investments in preparing climate change adaptation plans.

ANNEX A. MISSION TERMS OF REFERENCE

Terms of Reference and Scope of Work

USAID Modernizing Extension and Advisory Services (MEAS)

Terms of Reference for the Proposed Scoping Mission of Bihar's Pluralistic Agricultural Extension System for Brent Simpson
Sept, 24 to Oct, 5, 2012

Background

Following strong economic growth over the past 20 years in India as a whole, Bihar has become one of the fastest growing states in the country and has prioritized the modernization of agriculture to improve livelihoods in the rural sector. In the past two years, the government has invested significant resources into addressing agricultural productivity in Bihar, such as appointing over 6,000 Farm Advisors (FA) and 2,000 Subject Matter Specialists (SMS) to strengthen the agriculture extension in the state. The increasing government investment in agriculture combined with the underperformance and vulnerability of the rainfed rice-based system in Bihar, presents a significant opportunity to leverage efforts towards closing the gap in rice-based production in the state.

In February 2012 Catholic Relief Services (CRS) launched the BMGF-funded *Improved Rice-based Rainfed Agricultural Systems* (IRRAS). The IRRAS will identify, adapt and validate technology options to address key constraints to greater and more stable rainfed cropping productivity in drought- and flood-prone environments. The IRRAS Adaptive Research Pipeline will develop these agronomic practices in consultation with stakeholders to ensure they are locally relevant, effective, feasible, scalable and sustainable.

In addition to conducting research trials and demonstrations, IRRAS is using the first year of the project to engage key knowledge exchange actors[4] to establish a knowledge exchange partner network and conduct a needs, gaps and opportunities analysis for knowledge exchange. Stakeholders participating in the network include representatives from the Department of Agriculture, Bihar Agricultural Management & Extension Training Institute (BAMETI), state universities and their field extension units, NGOs, private sector actors, and progressive farmers. The analysis results will lay the groundwork for defining the Knowledge Exchange Agenda that will determine how to collaboratively move forward in the subsequent three years of the project.

The USAID-supported Modernizing Extension and Advisory Services (MEAS) has been conducting assessments of pluralistic demand driven extension services, principally to make

[4] "Knowledge exchange actors" is used here to describe agriculture stakeholders who actively share agricultural information with farmers in Bihar. Examples include: formal extension service providers; universities conducting crop research; large traders conducting product demonstrations on farmers' fields; as well as progressive farmers and small vendors who are recognized by area farmers as an information resource.

recommendations as to how the systems might work better. The IRRAS has requested MEAS to help assess the Bihar extension system in the IRRAS target areas, identifying the key knowledge exchange actors, as well as citing their strengths, limitations and opportunities for improvement. The assessment findings will be made available to the knowledge exchange partner network and will feed into their own analysis and agenda.

Objective

The primary objective of the mission will be to assess the pluralistic provisioning of extension in Bihar, giving specific attention to the organizational structure, coverage, relationships and major advisory services being carried out for specific groups of farmers and farm households by the public and private sectors, non-governmental organizations, and farmer associations/firms. The team will focus on the primary contributions and constraints of these different advisory service providers, as well as how each of these institutions and organizations might be strengthened in contributing to the IRRAS (?).

The assessment will concentrate on three IRRAS target districts, namely: Aurangabad, West Champaran, and Sitamarhi. It is assumed that although the assessment will focus on these districts, results and recommendations will be applicable to the rest of the state.

Methodologies, Approaches and Deliverables

Specifically, the MEAS team will:

- Meet with the director and key staff members of the Department of Agriculture (DoA) at the state, district and sub-district levels. The purpose of these meetings will be to assess the current structure, capacity and expertise of these DoA staff at all levels (e.g. number, sex, educational qualifications and areas of expertise), especially the subject matter specialists and front-line extension staff. The team will determine how these front-line extension workers carry out their extension/advisory service duties, what these are and whom they work with. The team will determine what these key leaders and front-line extension workers perceive as their primary achievements to date, as well as their human and financial resource constraints, as well as other structural or management constraints that may be limiting their capacity to provide improved advisory services to small-scale farm households.
    - Are the field staff receiving in-service training on new or recommended production practices, new market opportunities, how to organize producer groups and to link these farmers to markets, and so forth. What mechanisms exist for dissemination and feedback on new recommended technologies, i.e., how strong are the linkages between farmers, extension and private sector staff?
    - Do these field extension workers have sufficient financial and other resources (extension/ training materials, transportation, etc.) to allow them to access and provide

needed services to the different groups of farmers, e.g. landless, small and medium size farmers, including both men and women farmers?

- Are there deliberate efforts to increase women participation in extension activities and how successful are they? What strategy and capacity is in place for the DoA to recruit more female extension workers, especially at the post-secondary diploma or university degree level?
- Who determines what extension workers should focus on? To what extent are participatory methods used? Is there a structured method for evaluating performance of extension staff? Is there an MIS system in place that collects data (farmers reached, trainings conducted, etc)?
- Are extension workers primarily focusing on increasing the productivity of staple food crops (e.g. rice, wheat, maize, pulse and root crops) and/or are they also helping men and women farmers learn to diversify/intensify their farming systems so they can increase their farm income and improve household nutrition. How much attention is being given to specific high-value crops, livestock, fish and other products that can help farm families increase their household incomes and, thereby, improve family nutrition and health care services? The focus will be on the IRRAS target districts, but to the extent possible findings for other regions will be included.

- Meet with non-public extension providers, including NGOs, to address similar questions with of the public service; the team will identify their extension models, as well as assess their capabilities, performance and constraints in providing efficient and widespread advisory services to the farmers being served.
- Meet with Bihar universities and their government extension partners (KVKs) to determine their capacity, strengths and limitations. How effective are they in researching and generating new technologies/practices while also making them available to the public? How do they engage with government, NGOs, and farmers to share and receive feedback on research and promising technologies for extension?
- Meet with key private sector actors (e.g.,. input suppliers, large traders) that are an important link between farmers and the major agricultural product companies located outside Bihar. The team will identify the main private sector actors as well as assess how much knowledge exchange (trainings, meetings, demonstrations) is being conducted by private companies. The team will assess the companies' and traders' capabilities, performance and constraints in this area, as well as make recommendations for fostering extension-oriented partnerships between the public and private sectors.
- Meet with a representative array of farmer groups to investigate from where they receive their information. Who are the knowledge exchange actors in direct contact with small farmers of rice-based rainfed cropping systems? What are the current gaps and challenges related to the farmers' access to new agricultural information?

In addition, other issues will be addressed across these major categories of knowledge exchange actors, including: a) opportunities and challenges in meeting the non-formal

education and advisory service needs of male and female farmers; b) how these specific challenges are being addressed; c) are these teaching-learning materials that are being provided by these different groups of extension workers, appropriate in terms of the education/literacy levels of men and women farmers within the communities they serve?

The IRRAS research and information sharing activities will build demand for new rice varieties and pulse crops. What is the capacity of Bihar's formal and informal seed production systems to handle current demand as well as a rapid increase in demand for new varieties? How does the current seed system produce seed and distribute to farmers throughout Bihar. How does the system determine which crop varieties to produce and their relative quantities?

IRRAS will liaise with government departments including the Department of Agriculture, BAMETI and KVKs to test and adapt tools for communication and feedback related to the technologies generated in the AR Pipeline. To what extent can the current and emerging information and communication technologies (ICT) be enhanced to make technical information more readily available to both the field extension staff and farmers? Do men and women farmers have equal access to available ICT technologies? Which technologies should IRRAS tap into to share project-related technologies with a larger audience? What is the effectiveness in recent investments in radio extension and community radio programs?

In summary, this study will focus on:

1) Identifying the major gaps within the DoA, the NGOs and other extension/advisory service providers, including institutional capacity, human competency, sustainability, and policy limitations;

2) Recommending some near- and long-term investments that the IRRAS project could substantially increase the effectiveness and sustainability of these different extension and advisory service providers;

3) Determining the extent to which IRRAS can depend upon Bihar's knowledge exchange actors to participate in the adaptive research pipeline and make available the related technologies to a wider farmer audience.

A draft scoping report will be shared with CRS within one month after the team returns home. Then, after CRS staff (Tom Remington, John Varrieur, Michael Potts, Krishna Mohan) reviews the draft, the report will be finalized and submitted to CRS within two weeks after receiving their comments and feedback.

ANNEX B. PROGRAM OF VISITS

Modernising Extension and Advisory Services (MEAS)
Assessment Schedule and Key Contact List

Date	Place	Organization	Name of the Person	Designation
25-Sep-12	Patna	ICAR-RCER	Dr. K.M. Singh	Principal Scientist (Agricultural Economics) and Head, Division of Socio-Economic and Extension, ICAR-RCER
	Patna	ICAR-RCER	Dr. S.S. Singh	Principal Scientist (Agronomy) and Head, Division of Crop Research, ICAR-RCER
	Patna	ICAR-RCER	Dr.B.P.Bhatt	Director, ICAR-RCER
	Patna	Aga Khan Foundation	Mr. Shailesh Singh	State Programme Manager, Patna
	Patna	AKRSP (I)	Mr. Rajib Kumar Roul	Manager- Agriculture & Livelihoods, Patna
26-Sep-12	Patna	BRBN, SSCA	Mr. Baidyanath Yadav	Chief of Processing, BRBN & Director, SSCA)
	Patna	Dept. of Agriculture	Mr. Ram Chandra Ram	Ad.Director of Agriculture-Extension
	Patna	Dept. of Agriculture	Mr. Sanjay Kr. Singh	Asst. DA
	Patna	Dept. of Agriculture	Mr. Devnath Prasad	Asst. DA
	Patna	ATMA, Patna	Mr. Ved Narayan Singh	PD, ATMA, Patna
	Patna	ATMA, Patna	Mr. Brijendra Mani	DPD, ATMA, Patna
	Patna	BAMETI	Dr. Raj Narayan Singh	Director-BAMETI
	Patna	BAMETI	Dr. Rajesh Kumar	Assistant Director -BAMETI
	Patna	IFFCO	Dr. Manbodh Prasad	State Marketing Manager, Patna
	Patna	IFFCO	Mr. Hare Ram Rai	
	Patna	Indo Gulf Fertilizer	Mr. K.K. Nayal	DGM- Bihar & Jharkhand
	Patna	Indo Gulf Fertilizer	Mr. Santosh Kumar	Zonal Agronomist -Bihar & Jharkhand
Travel to Bettiah, West Champaran on 27th Sept'12				
27-Sep-12	Bettiah	DAO	Dr. Omkar Nath Singh	DAO, West Champaran
	Bettiah	Sub-divisional Agriculture Office	Mr. Vijay Prakash	SAO

Date	Place	Organization	Name of the Person	Designation
		(SAO)		
	Bettiah	SMS	Mr. Ghanshyam Sukla	SMS
	Bettiah	ATMA-Bettiah	Mr. Jitendra Pd Singh	DPD, ATMA, Bettiah
	Bettiah	KVK, Madhopur	Dr. S.N.Singh	PC, KVK, Madhopur
	Bettiah	Regional Research Station (RRS), Madhopur	Dr. Ujjwal Kr Rai	Jr. Scientist cum Asst. Professor
	Bettiah	KVK, Madhopur	Er. Manoj Kumar	SMS, Agri Engg., KVK, Madhopur
	Bettiah	KVK, Madhopur	Dr. Thakur Kr Mahoto	SMS, Plant Protection, KVK, Madhopur
	Bettiah	KVK, Madhopur	Dr. Kumari Suniti	SMS, Home Science, KVK, Madhopur
	Bettiah	Regional Research Station (RRS), Madhopur	Dr. P.K.Bharati	Jr. Scientist
	Bettiah	Indo-Gulf Fertilizer	Mr. T.N. Jha	Marketing Officer, IGF, East & West Champaran and Motihari District
28-Sep-12	Bettiah	Demo Plot Farmers and Farmer Group members		
	Bettiah	PACS	Mr. Binod Kr. Yadav	Chairman, PACS, Uttari Patjirwa Panchayat, Bairiya Block
	Bettiah	PACS	Mr. Nagendra Singh	Member, PACS
	Bettiah	Input Retailer	Mr. Santosh Kr. Gupta	Sumit Enterprises, Bairiya Block
	Bettiah	BAO	Mr. Riyaz Ali	BAO, Bairiya Block, Bettiah
	Bettiah	Wholesaler -Input Dealer	Mr. Sonu	Bhartiya Beej Khad Bhandar Ltd.
Travel to Muzaffarpur on 28th Sept'12 and Travel to Sitamarhi on 29th Sept'12				
29-Sep-12	Sitamarhi	DAO	Mr. Surendra Prasad	DAO, Sitamarhi
	Sitamarhi	BAO	Mr. Jai Narayan Ram	BAO, Runni Saidpur Block, Sitamarhi
	Sitamarhi	SMS	Mr. Vijay Kr, Mr. Harish Chandra Rai, Mr. Umashankar	SMS at Panchayat level
	Sitamarhi	FA	Mr. Jai Shankar	FA

Date	Place	Organization	Name of the Person	Designation
			Atikant	
	Sitamarhi	Demo Plot Farmers and Farmer Group members		
	Muzaffarpur	Input Dealer	Mr. Krishna B.	Electric Corner, Muzaffarpur
	Sitamarhi	Input Retailer	Mr. Sudhir Kumar	Kisan Seva Kendra, Koahi Chowk, Runni Saidpur
Travel from Muzaffarpur to Bodh Gaya on 30th Sept'12 and from Bodh Gaya to Aurangabad on 1st Oct'12				
01-Oct-12	Gaya	PRADAN, Gaya	Mr. Anil Verma	State Team Leader, PRADAN, Bihar
	Aurangabad	Demo Plot Farmers and Farmer Group members		
	Aurangabad	KVK	Dr. Nityanand	PC, KVK, Siris
	Aurangabad	KVK	Dr. B.K.Mandal (Horti), Dr. Rajeev Singh (Agronomy)	SMS, KVK, Siris
	Aurangabad	DAO	Mr. Silajeet Singh	DAO, Aurangabad
	Aurangabad	SMS	Mr. Ashok Kr. Singh, Mr. Rajesh Kr, Mr. Kamal Kr. Singh, Mr. Narendra Kr, Mr. Amarnath Azad	SMS at Panchayat level
	Aurangabad	SMS	Mr. S.K. Vidyarthi	SMS, Deo, Aurangabad
	Aurangabad	FA	Mr. Kalam Azad	FA, Hasouli Panchayat
	Aurangabad	FA	Mr. Ashok Kr. Sharma	FA, Kharkani Panchayat
02-Oct-12	Aurangabad	Demo Plot Farmers and Farmer Group members		
	Aurangabad	Input Retailer	Mr. Kuldeep Prasad	Sunderjung, Aurangabad
	Aurangabad	Wholesaler-Input	Mr. Arun Kumar	Owner, Kisan Khad Bhandar
Return to Patna on 2nd Oct'12				
03-Oct-12	Patna	Digital Green	Mr. Pawan Ojha (along with his team	Team Leader, DG, Bihar
Travel to Delhi on 3rd Oct'12				
04-Oct-12	CRS National Office, Delhi	MEAS team along with Dr. K.M Singh meeting		
05-Oct-12	Delhi	CIMMYT	Mr. Andrew Mc.	Head, South Asia, CIMMYT

Date	Place	Organization	Name of the Person	Designation
			Donald	
Post Schedule Assessment				
18-Oct-12	Patna	Farmer Advisory Services	Dr. K.M.Singh	Chairman, FAS
	Patna	Farmer Advisory Services	Mr. V.K.Tiwari	Technical Officer
	Patna	Kisan Call Centre (KCC)	Dr. M.S. Meena	Agriculture Extension, ICAR-RCER, Nodal Officer for KCC
	Patna	Kisan Call Centre (KCC)	Mr. M.M. Tiwari	State Manager, IFFCO-IKSL, Patna
	Delhi	Kisan Call Centre (KCC)	Mr. Virendra Mediratta	COO, IKSL, Delhi
	Delhi	Kisan Call Centre (KCC)	Mr. Srinivasan	CEO, IFFCO-IKSL
		Kisan Call Centre (KCC)	Mr. A.C.Jain	JD, Agriculture Information, nodal officer for KCC from Agriculture Dept.
29-Oct-12	Barh, Patna	Community Radio Station	Mr. Vishnu Deo Singh	Subject Matter Specialist-Extension Education, KVK, Barh,Patna
27-Nov-12	Aurangabad	BAO	Mr. Suresh Rajwansi	BAO, Deo Block
28-Nov-12	Aurangabad	BAO	Mr. Sachidanand Kumar	BAO, Aurangabad Block
29-Nov-12	Sitamarhi	KVK, Pupri	Dr. Ram Eshwar Prasad	PC, KVK, Pupri
	Sitamarhi	KVK, Pupri	Dr. Sachidanand	SMS, KVK,Pupri

ANNEX C. DOCUMENTS

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ANNEX D. STATE SCHEMES

Govt. Agriculture Schemes in Bihar

The major Govt. Schemes have been have been enlisted here. There are so many schemes in the state but the budget allocation in those schemes is not significant. There is a govt. agency under Ministry of Agriculture in Bihar, named BAMETI (Bihar Agriculture Management, Extension and Training Institute). This institute is governing the major govt. schemes in Bihar. A major program under Extension Reform called ATMA (Agriculture Technology Management Agency), which is covering RKVY, NFSM, SRI, SWI, etc. programs. The agency focuses over the quality of extension services and it's reach. Demonstration, Farmer's Training, Exposure visits, creating farmer's institutions, etc. are the major programs. The area covered is agriculture, horticulture, livestock, vegetable cultivation, medicinal crops, organic farming, etc.

The major schemes are as given under -

1. **Seed Village Program:** This program has been started in year 2010-11, led by DAO, covering four villages in each block of the state. The all farmers of the target villages receive Foundation seed at 50% subsidy up to half-acre land each, for seed production and distribution among the farmers. Capacity building is also an important part of the program, training is to be provided at three levels i.e. block, district and state level. Distribution of seed bin, at subsidized rates, for seed storage is also an important activity in this program.

2. **ISOPOM Project:** This is centrally sponsored scheme covering all the districts of Bihar, led by DAO in each districts. The aim is to increase the quality and quantity of produce of Oilseeds and Maize in the state. Besides this capacity building of farmers on new improved technologies in agriculture, Package of practice of the selected crops, etc. are the integral part of this program. The program covers activities like seed production, seed distribution, demonstration, farmers training, IPM, INM, soil reclamation, Farmer's fair, plant protection, etc.

3. **National Mission on Micro-irrigation:** This is a centrally sponsored scheme covering the whole state. The scheme is led by DAO. It focuses over increasing the water use efficiency. There are three types of schemes –

    I. Drip Irrigation System
    II. Sprinkler Irrigation system
    III. Micro Sprinkler Irrigation
    IV. Mini Sprinkler irrigation
    V. Portable sprinkler irrigation
    VI. Semi Permanent sprinkler irrigation

    There is no designated target and budget for this program, work is done on demand basis.

4. **Promotion of Power Tiller (Mini Tractor):** This scheme is sponsored by state govt. which is exclusively for promotion of Power tillers to the small and marginal farmers in the state. As Power tillers are very useful farm Machine and is very low cost compared to tractors, it is promoted for the small and marginal farmers on 50% subsidy of price or maximum upto Rs. 50000. There is no limitation of target/units to be provided in an financial year.

5. **Integrated Cereal Promotion Program:** This is centrally sponsored scheme (90% central govt. and 10 % state govt.) dedicated to promote the production and productivity of cereals in the state. There are four components in this program- **1. Crop Demonstration** (Demo. of paddy, SRI, Hybrid Rice, Wheat, SWI, etc.), **2. Seed distribution on subsidized rates, 3. Video-documentation of success stories for wider dissemination 4. Promoting use of Micronutrients in agriculture.** Besides this other extension activities are also accomplished in this scheme.

6. **Accelerated Seed Crash Program:** This is state sponsored scheme in which two farmers from each revenue village of the state will receive foundation seeds of improved variety of the selected crop for half acre area. The objective is to make available the improved seeds of different crops in the villages. This is focusing over cereals (Paddy and wheat) and pulses (gram and Lentil). The produce from Foundation seeds is available in the villages to be distributed among other farmers of the village. The scheme is led by DAO under supervision by Chief Minister of the state. In year 2010-11 the achievement is 78348 farmers in paddy (4694.88 quintals seeds), 83826 farmer in wheat (16765.20 quintals seeds), 43852 farmers in Gram (3508.22 quintals seeds) and 65960 farmers in Lentil (2638.4 quintals seeds) distributed among farmers.

7. **Farm Mechanization Program:** This scheme is centrally sponsored, started in year 2001-02, with the objective of increased use of machines in farming, cutting the cost of production, ensuring timely operations in farming, etc. In this program farm implements/machines are being provided to the farmers at subsidized rates. The scheme is led by DAO. Many schemes have integral component of mechanization viz ISOPOM, National Food Security Mission, Rashtriya Krishi Vikas Yojna, etc.

8. **National Food Security Mission:** This is centrally sponsored scheme, started in 2007-08 in Bihar, aimed to bring 4% annual increase in production of cereals and pulses to bring food security in the state and country. From year 2010-11 ISOPOM program is included under this. It is being implemented in all districts of Bihar (West Champaran, Sitamarhi and Aurangabad has been included). The activities included in this program are Demonstration of Cereals & pulses, seed distribution, minikit distribution, Hybrid seed distribution, distribution of minikits of micronutrients, Integrated Pest Management, distribution of farm implements, etc.

9. **Rashtriya Krishi Vikas Yojna:** This is also a centrally sponsored scheme similar to National Fiood Security Mission, but it includes coarse grains and minor millets promotion, soil reclamation, establishing of godowns for storage, Horticulture,

Veterinary & Livestock, Organic farming, Innovative proposals also. This is a very big program of Govt. of India for agriculture promotion.

10. **Integrated Pest Control Program:** This is centrally sponsored scheme aimed to subside the harmful effects of excessive use of pesticides. There are four components of this program – 1. Farmer's Field School, 2. Seed treatment program, 3. Seed Inoculation (Seed vaccination) Program and 4. Innovative proposed activities.

11. **Promotion of Organic Manure:** This is state sponsored scheme covering all the districts of the state. This is for promoting the production and use of organic manures like vermin- compost. In this program farmers can receive Rs. 3000 subsidy for creating structure for production of vermin-compost. For establishing vermin composting as enterprise the subsidy ranges to 50% of the cost or Maximum Rs. 25 lakhs.